XIV. Facility Engineering

OPERATIONS AND FACILITIES

A. Overseas 210-ft-diam Antenna Project,

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1. Introduction

Two existing 85-ft-diam antenna stations at overseas locations are being upgraded to 210-ft-diam antenna stations. The project includes the construction of two 210-ft antenna instruments, support facilities, and provisions for sufficient electronic equipment to meet the minimum performance requirements of spacecraft in the 1973 era. In addition to the antenna instrument, modifications must be made to the existing station facilities in order to adapt them for simultaneous use of the existing 85-ft antennas and the new 210-ft antennas. Figures 1 and 2 show the locations of the projects.

A fixed-price contract for the antenna instrument was executed with the Collins Radio Company on August 14, 1969, to:

(1) Review the detail engineering specifications, drawings, procedures, etc.

(2) Fabricate, transport, erect, and test two 210-ft antennas, one to be erected at Ballima (DSS 43) near Canberra, Australia, and the other at Robledo (DSS 63) near Madrid, Spain.

The facilities adaptation in Australia is being conducted jointly by the Australian Department of Supply, Network Support Facility, and the Australian Department of Works. In Spain, the facilities adaptation is under the supervision of the U.S. Navy, Naval Facilities Command, with an independent firm doing the actual engineering.

The tasks to be accomplished by the overseas agencies are as follows:

(1) Modifications of the operations and engineering building.

(2) Modifications and addition to the utilities support–power plant building.

(3) Modifications to and extension of site utilities.

(4) Modifications and extension of power generation and distribution systems.

(5) Modifications to site grading and paving.

(6) Site modifications and preparation for installation of high-power transmitter facilities.

(7) New RF protection tunnel and covered access walkway from the 210-ft antenna pedestal to the existing operations and engineering building.

(8) Fire protection.

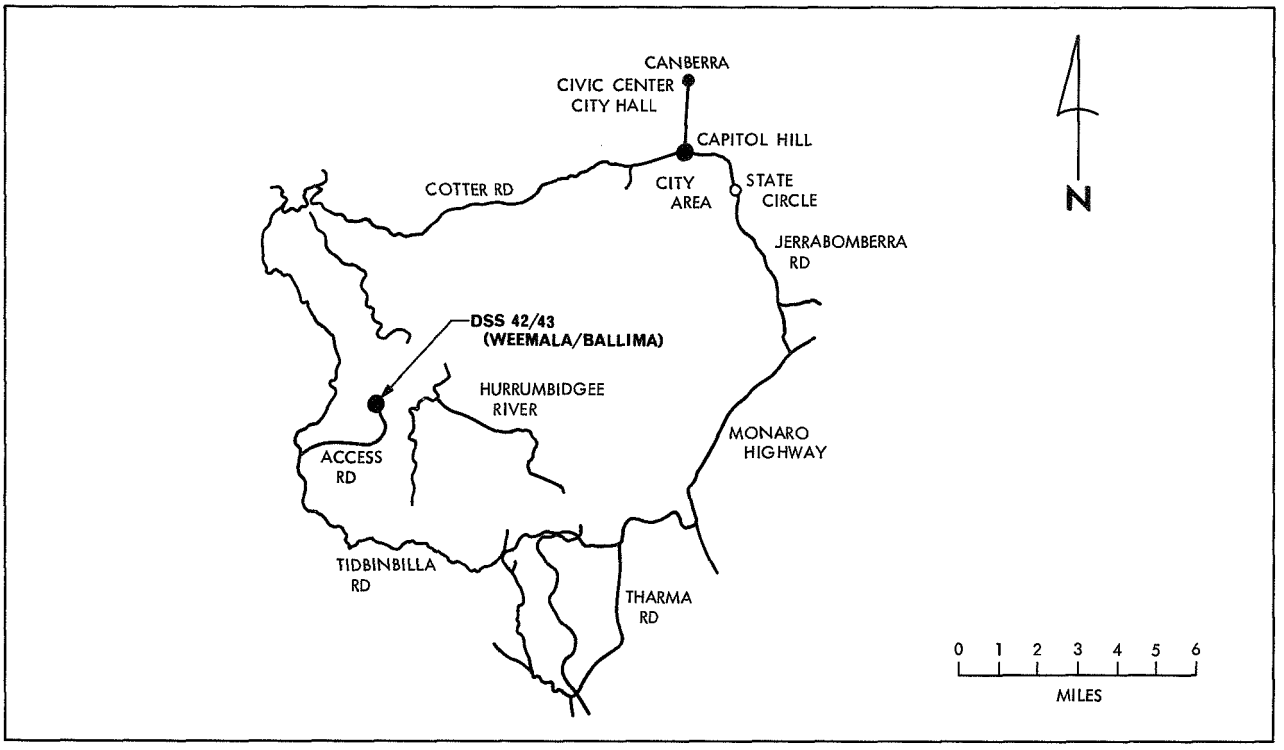

Fig. 1. Site location in Australia

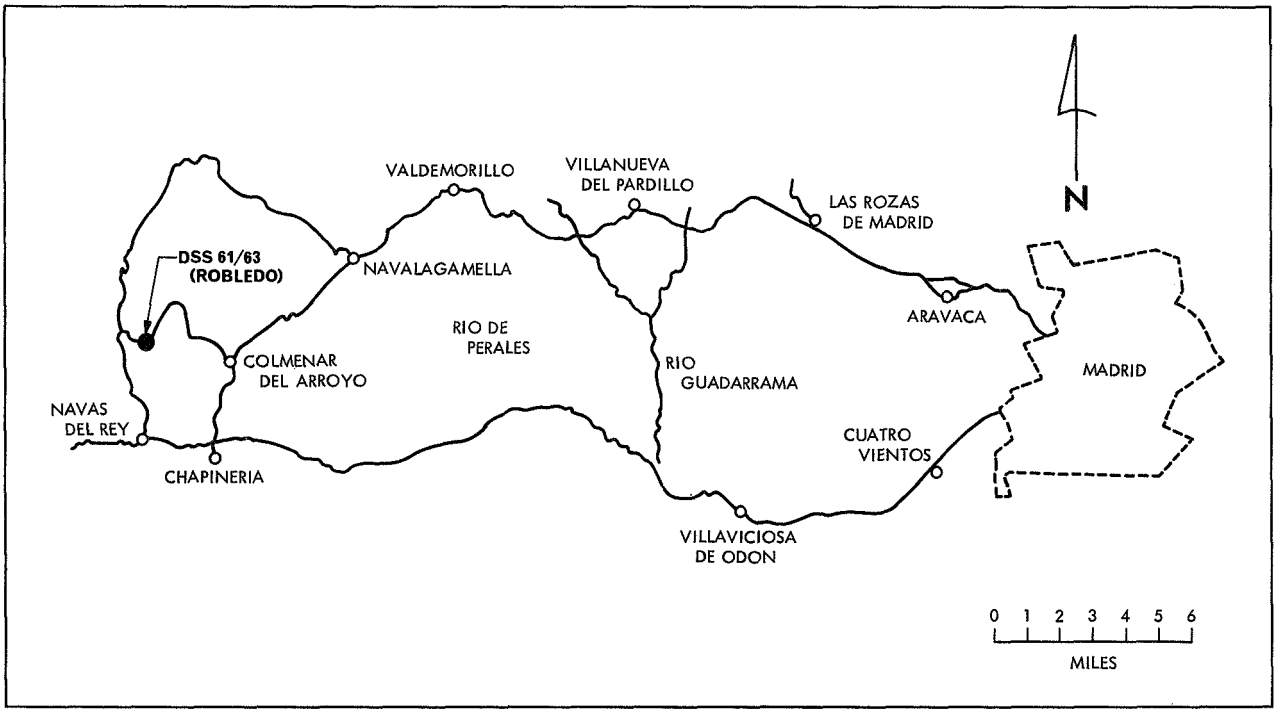

Fig. 2. Site location in Spain

In both Australia and Spain, the cognizant overseas agencies are responsible for the construction, by subcontract, of all work under their supervision; however, overall project responsibility remains with JPL. The planned configurations for the Canberra and Madrid sites are shown in Figs. 3 and 4. All work outside the dashed line is to be done by the overseas agencies. The high-power transmitter facilities are also their responsibility.

All antenna subsystems, other than the antenna mechanical subsystem and the facilities subsystem, will be furnished and installed by JPL.

2. Progress

a. Engineering review. Review of engineering specifications, drawings, procedures, etc., has been completed and accepted as correct by the contractor (Collins Radio Co.).

b. Fabrication. Collins Radio Company has subcontracted the following antenna components:

Component	Subcontractor
Bull gears and drive assemblies	Philadelphia Gear Corp.
Elevation bearing assembly	National Steel and Ship Building Co.
Azimuth radial runner	Westinghouse Electric Corp.
Reflector tipping assembly	Coeur d'Alenes Steel Co.
Surface panels	Radiation Systems, Inc.
Alidade, quadripod, apex, instrument tower, and alidade building	Precision Fabrication, Inc.
Hydrostatic bearing and azimuth bearing trucks	Western Gear Corp.

Fabrication to date is progressing in a satisfactory manner and on schedule. To insure against improper fabrication and costly construction delays, extensive trial erections of major components are being conducted in the fabricators' facilities prior to shipment. Figures 5, 6, and 7 show examples of these trial erections.

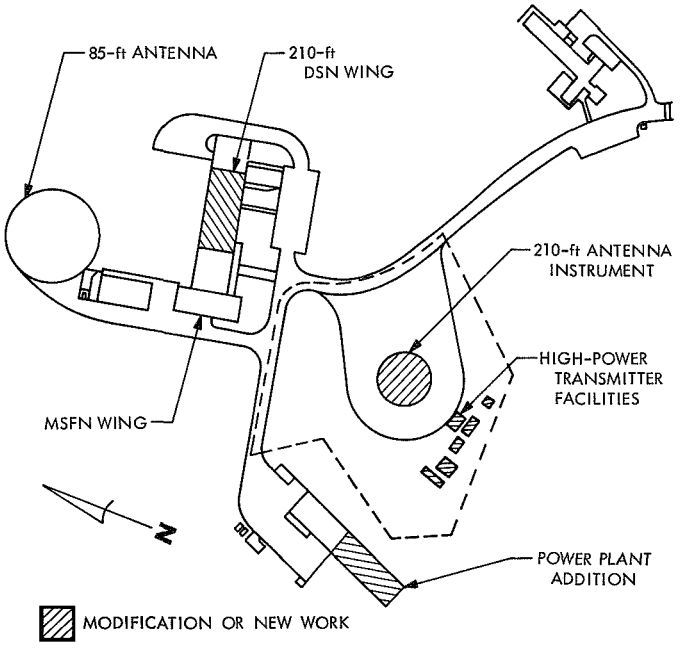

Fig. 3. Plot plan of Canberra complex

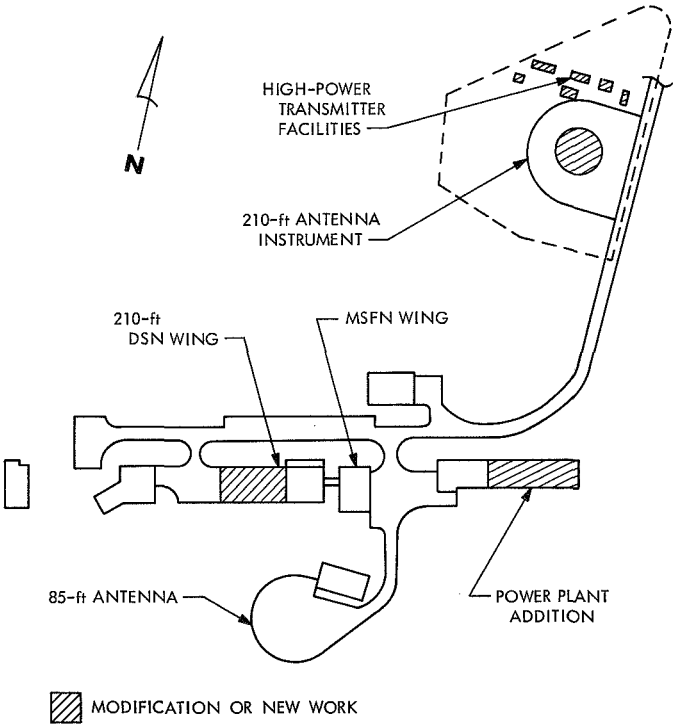

Fig. 4. Plot plan of Madrid complex

The tricone and rotary hyperbola were first erected and tested at DSS 14, Goldstone, California (SPS 37-63, Vol. II, pp. 56–60). After successful operation at Goldstone, these subsystems were accepted as standard for

Fig. 5. Alidade

Fig. 6. Elevation wheel

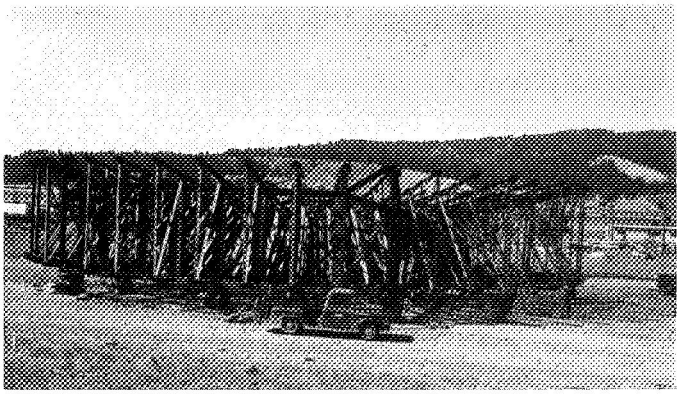

Fig. 7. Reflector backup structure

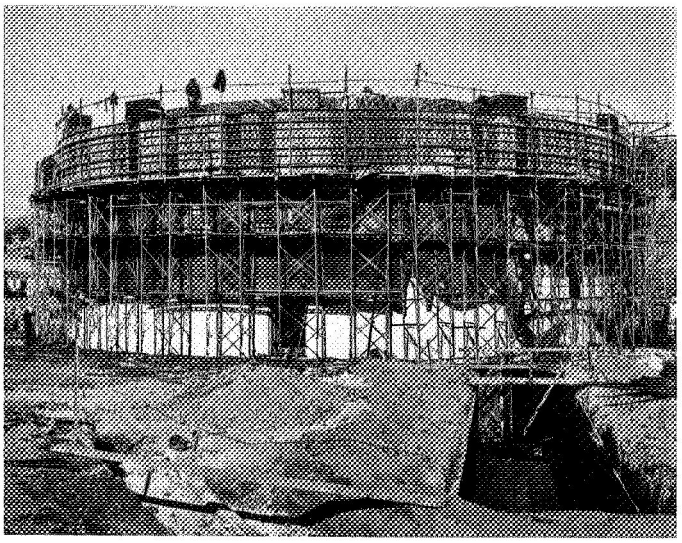

Fig. 8. Pedestal construction at DSS 43

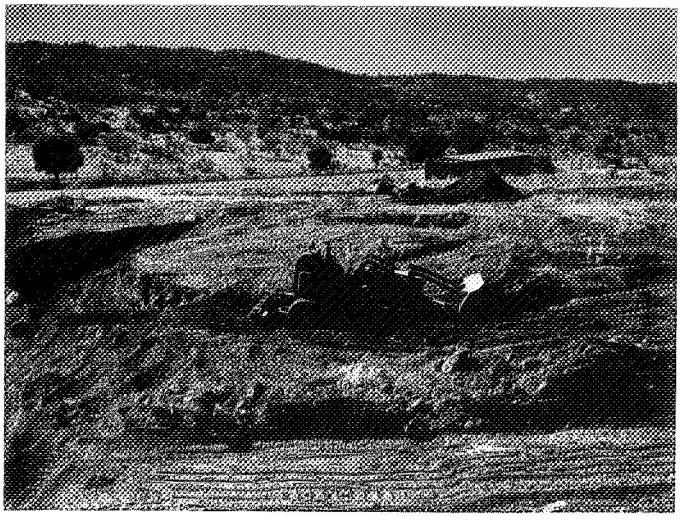

Fig. 9. Pedestal excavation at DSS 63

the 210-ft-antenna subnet. After installation on the overseas antennas, all of the DSIF 210-ft antennas will be of the same structural–mechanical configuration.

A contract has been placed with Philco-Ford for the fabrication, installation, and test of tricone systems for each of the overseas 210-ft antenna projects. This work is a part of the project and will be completed after the work of the antenna prime contractor.

c. Construction. Construction began at DSS 43 on November 20, 1969. The instrument tower and pedestal concrete are virtually complete and progressing on schedule. In Australia, Collins is acting as the construction contractor.

At DSS 61A, construction began on June 22, 1970. Excavation, site preparation, and utility work are progressing on schedule. The pedestal subcontractor in Spain is Laing-Ibecia, an English–Spanish company. The steel erection subcontractor has not yet been selected by Collins Radio Company. Figures 8 and 9 show the construction sites and the progress that has been made.

d. Facility design. Design of facility adaptations by the overseas agencies is progressing satisfactorily. In both Australia and Spain, the 30% design review is complete. At this time, effort is being made to coordinate modifications of the control rooms to permit support of presently scheduled spacecraft projects.